

ABSTRACT

A sensor temperature control means (18) for controlling the temperature of an active element (10) of an exhaust gas sensor (O_2 sensor) (8) disposed in an exhaust passage (3) estimates the temperatures of the active element (10) and a heater (13) based on an element temperature model which is representative of a temperature change of the active element due to heat transfer between the active element (10) and the heater (13) which heats the active element and heat transfer between the active element (10) and an exhaust gas, and a heater temperature model which is representative of a temperature change of the heater due to heat transfer between the active element (10) and the heater (13) and the supply of electric power to the heater (13), and controls the heater (13) to equalize the temperature of the active element (10) or the heater (13) with a predetermined target temperature using estimated values of the temperatures. It is possible to accurately estimate the temperature of the active element (10) of the exhaust gas sensor (8) or the heater (13), and control the temperature of the active element (10) of the exhaust gas sensor (8) stably at a desired temperature using an estimated value of the temperature.